Hadronic Spectral Functions below and above the Deconfinement Phase Transition

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We present results of our new analysis of meson spectral functions in several channels (π, ρ, and J/ψ) below and above the deconfinement temperature using the maximum entropy method (MEM). The MEM for lattice data was recently developed by the present authors [1].

We have carried out simulations on an 1:4 anisotropic lattice with the quenched approximation and the Wilson fermions using CP-PACS at University of Tsukuba.

We shall first argue that at least approximately 30 data points are required in the imaginary time direction in order to obtain reliable spectral functions with MEM.

Then, we shall present our results obtained on large anisotropic lattices of the sizes $32^3 \times (32 \sim 96)$, corresponding to temperatures ranging from $\sim 0.8T_c$ to $\sim 2.5T_c$. The lattice spacing is $a_\tau \simeq 9.8 \times 10^{-3}$ fm.

Our results indicate that spectral functions continue to possess non-trivial structures even above T_c.

[1] See a review: M. Asakawa, T. Hatsuda and Y. Nakahara, Prog. Part. Nucl. Phys. vol.46 (2001) 459.